TOWARDS THE DEVELOPMENT OF THE NEW ZEALAND HEARING IN NOISE TEST (NZHINT)

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Abstract

The ability to understand speech in noise has a profound impact on everyday communication, but cannot be predicted on the basis of puretone thresholds and/or performance on tests of speech in quiet. The aim of this thesis was to develop an adaptive speech in noise test based on the Hearing in Noise Test (HINT) that would be reliable and valid for speakers of New Zealand English (NZE). The methodology used followed the standard procedures for developing the HINT in a new language. Five hundred sentences of 5-7 syllables were collected from New Zealand children's books and recorded by a native NZE speaker. Nine normal-hearing native NZE speakers aged 18-50 listened to three sets of 50 sentences at -2, -4 and -7 dB signal-to-noise ratios (SNR) in order to establish a performance-intensity (PI) function for these sentences. Three groups of 10 participants were scored on their performance on the sentences in 65 dBA speech-weighted noise at varying SNR. After each round of testing with a new group of participants, the SNR of each sentence was adjusted in order to get closer to 70% intelligibility for all sentences. Sentences that were too easy or difficult or did not respond to adjustments were discarded. Once the remaining 240 sentences were of approximately equal intelligibility, 24 phonemically matched lists of 10 sentences were formed and tested on 12 participants using the adaptive HINT software. The overall mean threshold was calculated as -6 dB, s.d=1.1 dB. The lists were combined to form 12 lists of 20 sentences which would become the NZHINT. Time delays meant that the collection of normative data could not be completed.

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Abbreviations

AmE	American English
BM	Basilar membrane
CF	Characteristic frequency
COSI	Client Oriented Scale of Improvement
CST	Connected Speech Test
CUNY	City University of New York
dB	decibels
HEI	House Ear Institute
HI	Hearing impaired
HINT	Hearing in Noise Test
HL	Hearing level
Hz	Hertz
IHC	Inner hair cells
NH	Normal hearing
NU-6	North-Western University Auditory Test Number 6
OHC	Outer hair cells
ONZE	Origins of New Zealand English Project
PEST	Parameter estimation by sequential testing
PH	High predictability
PL	Low predictability
PI	Performance-Intensity
PTA	Puretone average
QuickSIN	Quick Speech in Noise
RMS	root-mean-square
SCAN	Screening test for Auditory Processing Disorder
SL	Sensation Level
SNHL	Sensorineural hearing loss
SNR	Signal-to-noise ratio
SPIN	Speech Perception in Noise
SRT	Speech Reception Threshold
WIN	Words in Noise
NZE	New Zealand English
NZHINT	New Zealand Hearing in Noise Test